Trend Study 16B-18-99

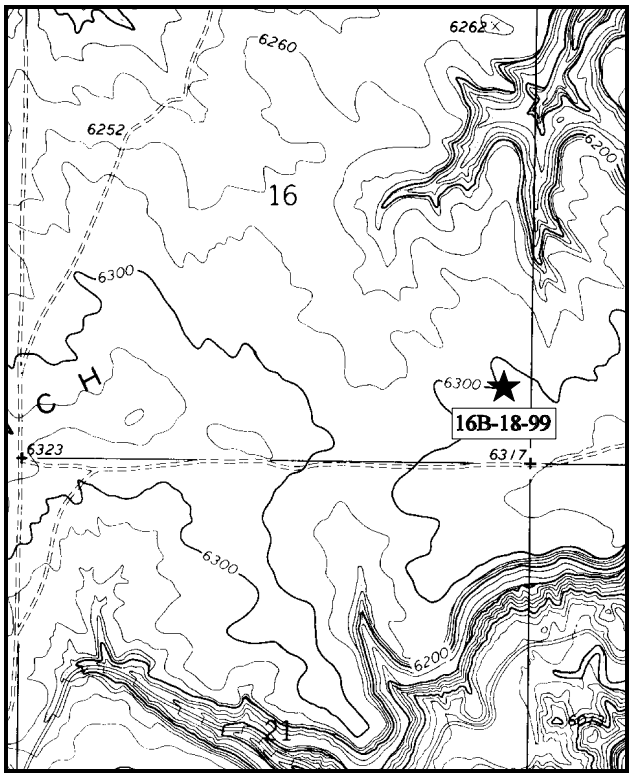
Study site name: Porphyry Bench . Range type: Big Sagebrush - Grass .

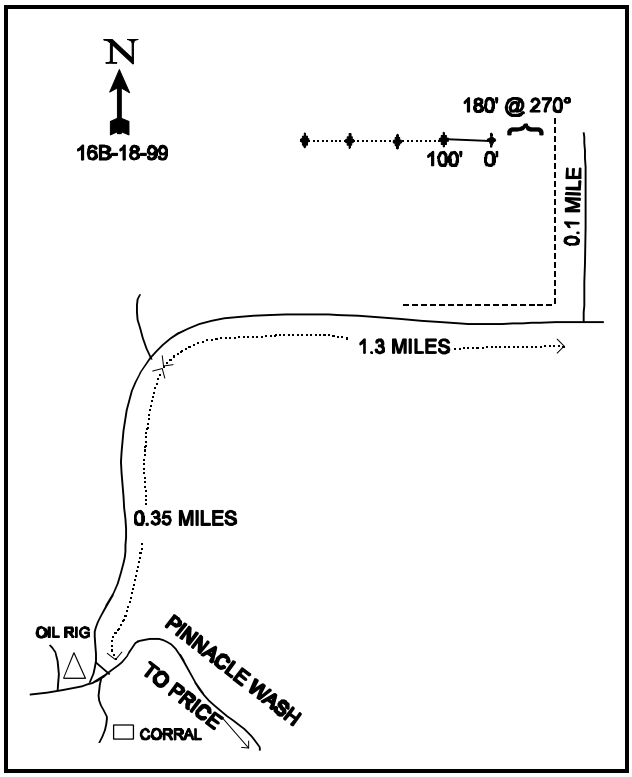
Compass bearing: frequency baseline 270°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Take Westwood Blvd (1550 W) northwest out of Price 2.35 miles to a major intersection. Turn left onto Gordon Creek Road and travel 0.45 miles to a fork. Bear left away from Gordon Creek, going 0.1 miles to a gravel pit. Continue 5.2 miles on the Pinnacle Peak Road to a 3-way fork at the top of the bench. Go right 0.35 miles to a fork. Bear right and continue 1.3 miles, going alongside a fence to the SE corner. Turn left and go along the fence 0.1 mile to the fifth wood post from the corner. Walk west into the sagebrush 180 feet to the 0-foot baseline stake. It is a 1 1/2 foot tall fencepost marked by browse tag #9021.





Map Name: Pinnacle Peak

Diagrammatic Sketch

Township 14S , Range 9E , Section 16

UTM 4383381.268 N, 507730.346 E

DISCUSSION

Trend Study No. 16B-18 (30-4)

The Porphyry Bench study site is located on Porphyry Bench which is critical deer winter range. The bench is largely a sagebrush/grass type, with juniper covered side hills and draws. The study is on a very gentle (1-2%) west-facing slope at an elevation of 6,300 feet. Located on a fenced 1/4 section of DWR land, the study site shows signs of heavy deer use. A nearby pellet group transect has had an average of 45 deer days use/acre between 1988 and 1994. Pellet group transect data from 1999 on the study site indicate extremely high deer use with an estimated 149 deer days use/acre (369 ddu/ha). Use by elk and livestock is light with an estimated 1 elk days use/acre (3 edu/ha) and 4 cow days use/acre (9 cdu/ha).

The soil appears to be moderately deep with an estimated effective rooting depth of just over 16 inches. A compacted layer is present at about 16 inches below the surface. Rock and pavement cover is nearly non-existent on the surface, and very little is found in the profile. The soil has a loam texture with a moderately alkaline pH (8.1). Potassium is very low at 25.6 ppm, when 70 ppm is the minimal level shown to be necessary for normal plant development and growth. Surface erosion is minimal on the site due to the level topography and substantial vegetation and litter cover. Evidence of some pedestaling is apparent around the base of sagebrush stems and the larger bunch grasses.

Wyoming big sagebrush is the key species for this site. When this site was initially established in 1988, the Wyoming big sage population was characterized as being large and vigorous with good leader growth, with marginal seed production. The mature shrubs sampled in 1988 were heavily utilized with 48% of the shrubs displaying heavily hedging. Density was 6,933 plants/acre, 19% of which were young shrubs. Vigor was generally good, but 46% percent of the population was classified as decadent. By 1994, there was an estimated 6,200 mostly mature sagebrush (71%). No seedlings were encountered and young plants numbered only 220 plants/acre. Utilization was light and vigor had improved. Percent decadency also declined to 25%. Currently, the population is estimated at 7,540 plants/acre, with 62% of these being mature plants. Biotic potential is very low (1%), with moderate recruitment from the young age class (10%). Percent decadency slightly increased from 25% to 28%, with plants displaying poor vigor remaining nearly the same. Deer use of the area has greatly increased since the 1994 reading as evidenced by pellet group counts and the level of use on the mature shrubs. Heavy use was displayed on 56% of the population in 1999, where no plants were classified as such in 1994. Seed production is currently very low. Continued heavy use coupled with drought could result in the decline of the sagebrush population in the future.

Clumps of pricklypear cactus are exceptionally abundant. The cactus has been nearly as abundant as sagebrush over all sampling years in terms of strip frequency, and currently provides 4% cover, or 24% of the browse cover. Age class analysis indicates a mostly mature population with increasing decadency since the last reading (1% to 10%). The fragile pricklypear spreads readily, as the joints easily break off and then root. A few curlleaf mountain mahogany and winterfat occur in the vicinity, but these valuable species are relatively uncommon.

The most abundant grass is needle-and-thread with a quadrat frequency on average of 88% over all sampling periods. Cover provided by this species was high in 1994 at nearly 9%, increasing to nearly 10% in 1999. Needle-and-thread currently provides 69% of the grass cover, and 31% of the total vegetation cover on the site. Generally vigorous, some individuals had a black fungus on the seed heads in 1988. Other grasses present at the site include: Indian ricegrass, bottlebrush squirreltail and Salina wildrye. Several species of annual forbs and also cheatgrass are present, but are not very common. Perennial forbs include scarlet globemallow, longleaf phlox, and lobeleaf groundsel.

1994 TREND ASSESSMENT

Ground cover characteristics have improved on this site. Aerial cover of vegetation currently covers nearly 28% of the ground surface. Fifty-three percent of that cover comes from grasses and forbs. Litter cover has declined, but this trend is common during these dry years. Bare ground has also declined from 43% to 35%, and erosion is not currently a problem. The browse trend is currently stable. Percent decadency has declined from 46% to 25%. No seedlings were encountered in 1994, and young plants only make up almost 4% of the population. Reproductive potential will likely improve with normal precipitation patterns.

Sum of nested frequency of grasses and forbs have both increased indicating an improving trend. The most abundant grass, needle-and-thread, declined slightly in nested frequency while Salina wildrye and squirreltail both increased significantly. Perennial forbs are lacking on this site with only 5 species encountered in 1994. The only perennial forb that is very abundant is scarlet globemallow which makes up 81% of the forb cover.

TREND ASSESSMENT
soil - slightly improving
browse - stable
herbaceous understory - up

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover from herbaceous vegetation increased while cover from litter and bare ground decreased. Erosion is minimal due to the gentle slope. Trend for browse is stable. Wyoming big sagebrush has a stable density with a moderate level of recruitment (10%). Biotic potential is very low at 1%. Percent decadency only slightly increased in 1999 to 28%. A major factor that will influence the condition of the sagebrush population in the future is the level of use, associated with drought, if applicable. In 1994, no plants displayed heavy use, while 56% of the population were heavily browsed in 1999. If continued, this high level of use could cause a downward trend in the sagebrush on this critical winter range. Trend for the herbaceous understory is stable. Sum of nested frequency and cover for perennial species slightly increased since 1994. Annual species such as cheatgrass are still insignificant in the understory.

TREND ASSESSMENT
soil - stable
browse - stable
herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 16B, Study no: 18

Type	Species	Nested Frequency '88	'94	'99	Quadrat Frequency '88	'94	'99	Average Cover % '94	'99
G	Bouteloua gracilis	$_{a}$1	$_{ab}$8	$_{b}$11	1	3	7	.06	.22
G	Bromus tectorum (a)	-	3	-	-	1	-	.00	-
G	Elymus salina	$_{a}$21	$_{b}$91	$_{b}$84	9	35	31	.67	1.79
G	Oryzopsis hymenoides	59	40	67	28	19	29	1.26	2.12
G	Sitanion hystrix	$_{b}$43	$_{b}$77	$_{a}$13	21	31	7	1.15	.28
G	Sporobolus cryptandrus	$_{a}$3	$_{b}$13	$_{a}$-	1	7	-	.39	-
G	Stipa comata	262	250	256	96	88	90	8.67	9.88
Total for Annual Grasses		0	3	0	0	1	0	0.00	0
Total for Perennial Grasses		389	479	431	156	183	164	12.24	14.31
Total for Grasses		389	482	431	156	184	164	12.24	14.31
F	Astragalus convallarius	$_{b}$10	$_{a}$-	$_{ab}$4	3	-	1	-	.00
F	Calochortus nuttallii	-	-	5	-	-	2	-	.03
F	Castilleja spp.	-	-	2	-	-	1	-	.00
F	Chenopodium leptophyllum (a)	-	$_{b}$19	$_{a}$-	-	7	-	.03	-
F	Cruciferae	6	-	-	2	-	-	-	-
F	Eriogonum alatum	-	-	2	-	-	1	-	.00
F	Eriogonum cernuum (a)	-	$_{b}$8	$_{a}$-	-	3	-	.01	-
F	Lappula occidentalis (a)	-	$_{b}$16	$_{a}$-	-	6	-	.05	-
F	Lesquerella spp.	$_{ab}$5	$_{b}$7	$_{a}$-	2	3	-	.01	-
F	Lomatium spp.	-	-	4	-	-	2	-	.01
F	Machaeranthera canescens	2	-	-	1	-	-	-	-
F	Orobanche spp.	1	-	-	1	-	-	-	-
F	Penstemon caespitosus	1	-	-	1	-	-	-	.00
F	Phlox longifolia	$_{a}$-	$_{b}$4	$_{c}$68	-	3	30	.04	.32
F	Plantago patagonica (a)	-	$_{b}$37	$_{a}$9	-	16	3	.08	.01
F	Schoencrambe linifolia	-	-	3	-	-	1	-	.00
F	Senecio multilobatus	6	5	6	3	2	3	.01	.04
F	Sphaeralcea coccinea	$_{a}$94	$_{a}$125	$_{b}$126	44	55	53	1.13	1.59
F	Taraxacum officinale	$_{a}$-	$_{b}$10	$_{a}$-	-	3	-	.01	-
F	Tragopogon dubius	3	-	-	1	-	-	-	-
F	Zigadenus paniculatus	-	-	3	-	-	1	-	.00
Total for Annual Forbs		0	80	9	0	32	3	0.18	0.01
Total for Perennial Forbs		128	151	223	58	66	95	1.22	2.02
Total for Forbs		128	231	232	58	98	98	1.40	2.04

Values with different subscript letters are significantly different at % = 0.10

BROWSE TRENDS --
Herd unit 16B, Study no: 18

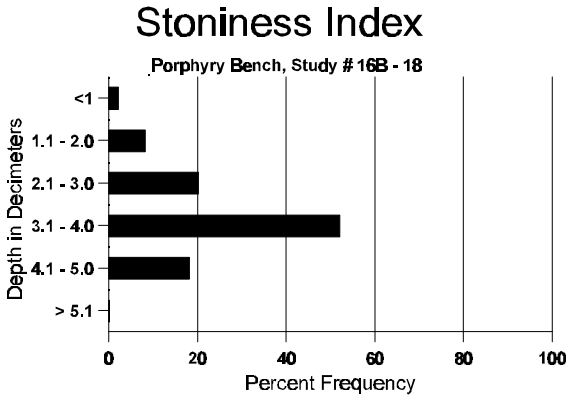
Type	Species	Strip Frequency '94	Strip Frequency '99	Average Cover % '94	Average Cover % '99
B	Artemisia tridentata wyomingensis	85	95	10.81	11.91
B	Cercocarpus ledifolius	0	0	-	-
B	Chrysothamnus viscidiflorus	0	4	-	.03
B	Gutierrezia sarothrae	3	11	.03	.10
B	Opuntia fragilis	93	93	2.96	3.74
Total for Browse		181	203	13.81	15.78

BASIC COVER --
Herd unit 16B, Study no: 18

Cover Type	Nested Frequency '94	Nested Frequency '99	Average Cover % '88	Average Cover % '94	Average Cover % '99
Vegetation	327	336	5.50	27.77	31.73
Rock	1	-	0	.00	0
Pavement	29	3	0	.05	.00
Litter	386	377	49.50	35.52	29.25
Cryptogams	76	176	2.25	.90	7.30
Bare Ground	346	333	42.75	35.40	26.54

SOIL ANALYSIS DATA --
Herd Unit 16B, Study # 18, Study Name: Porphyry Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
16.1	58.4 (12.6)	8.1	47.3	30.2	22.6	1.1	12.3	25.6	0.6



PELLET GROUP DATA --
Herd unit 16B, Study no: 18

Type	Quadrat Frequency '94	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	21	32	n/a
Elk	11	2	1 (2)
Deer	52	79	149 (368)
Cattle	-	1	4 (10)

BROWSE CHARACTERISTICS --
Herd unit 16B, Study no: 18

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	88	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
Y	88	8	4	3	-	-	-	5	-	-	18	-	1	1	1333			20
	94	11	-	-	-	-	-	-	-	-	11	-	-	-	220			11
	99	13	22	2	-	-	-	2	-	-	39	-	-	-	780			39
M	88	1	13	22	-	-	-	-	-	-	36	-	-	-	2400	17	21	36
	94	215	3	-	3	-	-	-	-	-	221	-	-	-	4420	17	24	221
	99	-	16	69	4	55	78	10	-	-	232	-	-	-	4640	16	24	232
D	88	4	19	25	-	-	-	-	-	-	37	-	8	3	3200			48
	94	74	4	-	-	-	-	-	-	-	59	-	-	19	1560			78
	99	1	4	19	9	21	43	7	-	2	80	-	-	26	2120			106
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	1360			68
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	1740			87

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	35%	48%	13%	-11%
'94	02%	00%	06%	+18%
'99	31%	56%	07%	

Total Plants/Acre (excluding Dead & Seedlings)				
'88	6933	Dec:	46%	
'94	6200		25%	
'99	7540		28%	

Cercocarpus ledifolius																		
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	-	1	1	-	-	-	-	-	-	2	-	-	-	133	15	8	2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	33%	33%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'88	199	Dec:	-
'94	0		-
'99	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus																		
M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	10	5
% Plants Showing		Moderate Use		Heavy Use		Poor Vigor									%Change			
	'88	00%		00%		00%												
	'94	00%		00%		00%												
	'99	00%		00%		00%												
Total Plants/Acre (excluding Dead & Seedlings)													'88		0	Dec:		-
													'94		0			-
													'99		100			-
Gutierrezia sarothrae																		
Y	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	28	-	-	-	-	-	-	-	-	28	-	-	-	560			28
M	88	12	-	-	-	-	-	-	-	-	12	-	-	-	800	8	4	12
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	7	4
	99	24	-	-	-	-	-	-	-	-	24	-	-	-	480	3	5	24
% Plants Showing		Moderate Use		Heavy Use		Poor Vigor									%Change			
	'88	00%		00%		00%									-92%			
	'94	00%		00%		00%									+92%			
	'99	00%		00%		00%												
Total Plants/Acre (excluding Dead & Seedlings)													'88		1066	Dec:		-
													'94		80			-
													'99		1040			-
Opuntia fragilis																		
S	88	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	88	53	-	-	-	-	-	-	-	-	53	-	-	-	3533			53
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	99	14	-	-	-	-	-	-	-	-	14	-	-	-	280			14
M	88	63	-	-	-	-	-	-	-	-	60	-	3	-	4200	3	9	63
	94	342	-	-	-	-	-	-	-	-	342	-	-	-	6840	3	12	342
	99	316	-	-	-	-	-	-	-	-	295	-	21	-	6320	3	12	316
D	88	6	-	-	-	-	-	-	-	-	4	-	2	-	400			6
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	99	37	-	-	1	-	-	-	-	-	5	-	6	27	760			38
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		Moderate Use		Heavy Use		Poor Vigor									%Change			
	'88	00%		00%		04%									-14%			
	'94	00%		00%		00%									+ 5%			
	'99	00%		00%		15%												
Total Plants/Acre (excluding Dead & Seedlings)													'88		8133	Dec:		5%
													'94		6960			1%
													'99		7360			10%